

5.14 MICROMETEOROID AND ORBITAL DEBRIS (MMOD) SHIELDING

The MMOD will be designed, analyzed, built and integrated by NASA/ESCG. The shielding is designed to protect the pressure systems on the AMS-02 experiment according to the environments specified in SSP 30425, paragraph 8.0. These systems include the Vacuum Case, Warm Helium Supply, and the TRD Gas System which contains both the Xe tank and CO₂ tank. The location of these components on AMS-02 is shown in figures 5.14-1 and 5.14-2.

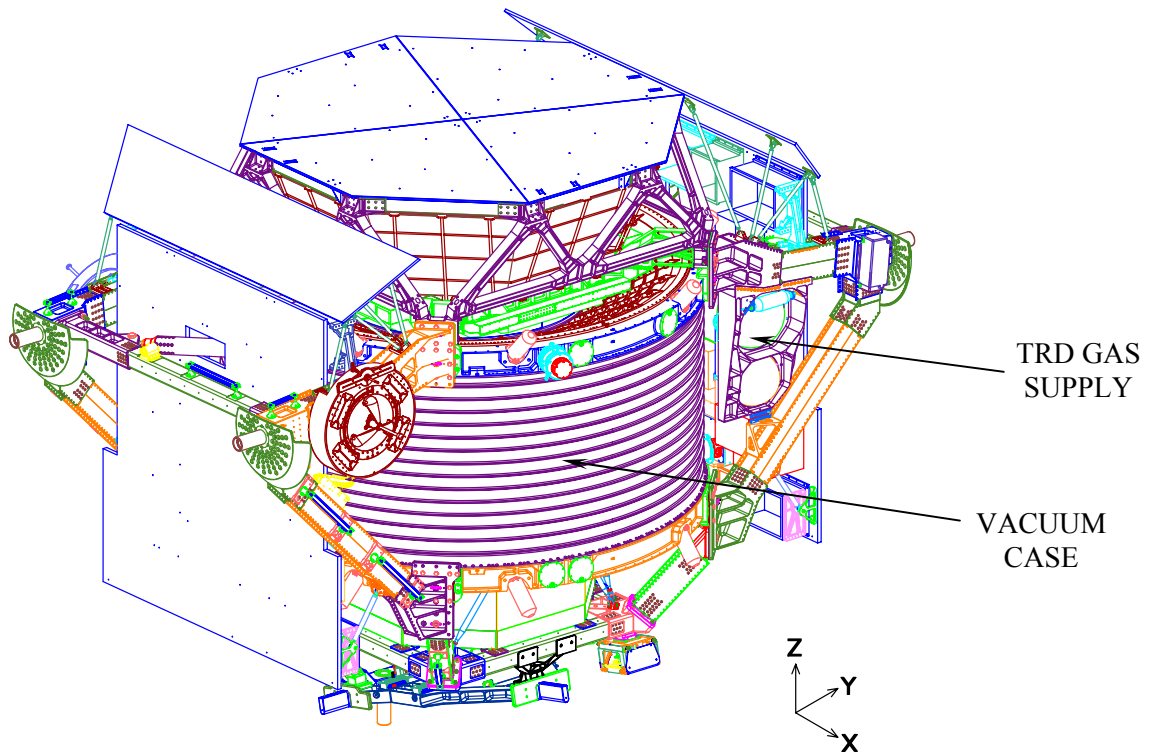


Figure 5.14-1 AMS-02 Payload Assembly (1 of 2)

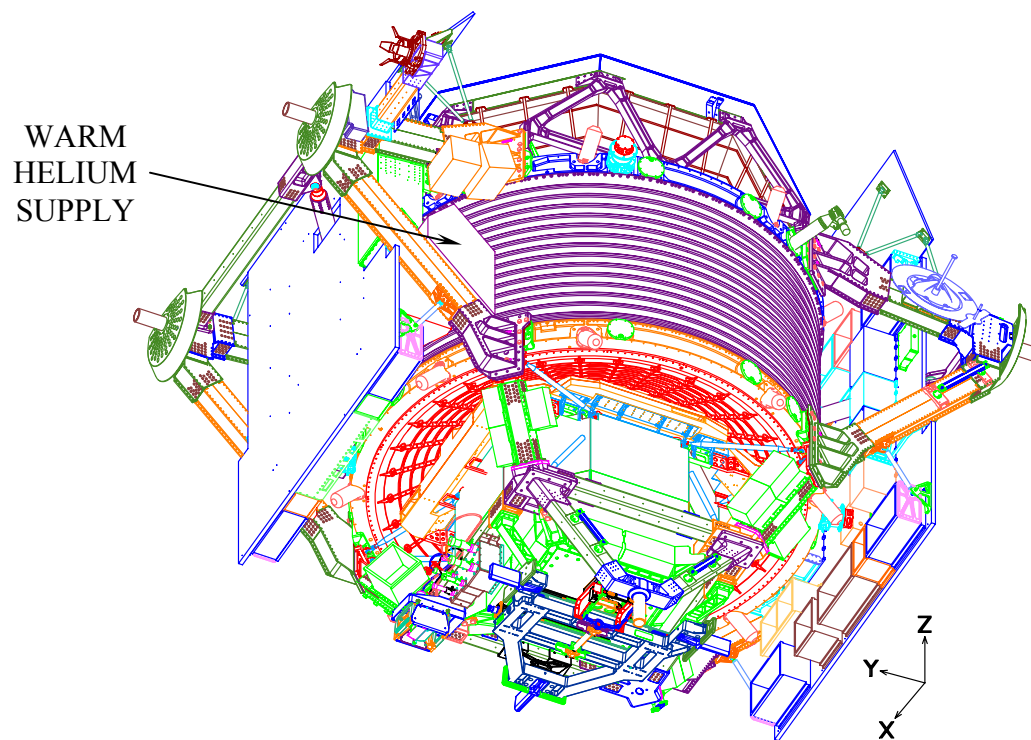


Figure 5.14-2 AMS-02 Payload Assembly (2 of 2)

The shielding will be made from various components in different locations depending on the required shield thickness, shape and size. The proposed MMOD shielding for AMS-02 consists of a 0.1 inch outer and inner aluminum sheet with a layer of 0.1 inch Kevlar/Nextel. Standoffs will be used to separate the outer aluminum sheet from the inner aluminum sheet. The proposed shield design is shown in figure 5.14-3. Both sets of MMOD shields will have the same general design.

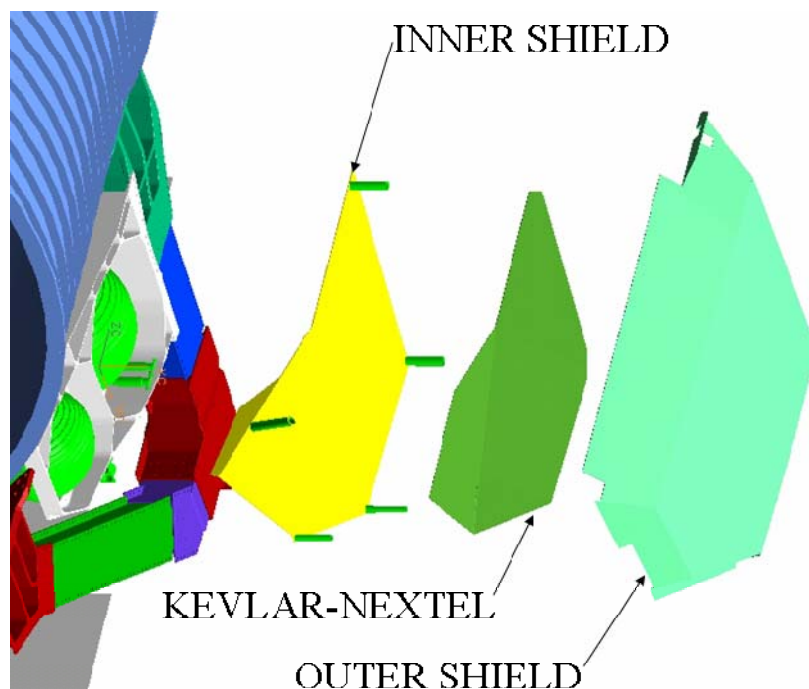


Figure 5.14-3 Proposed MMOD Shield Design

The shield assemblies will be bolted to the Upper and Lower Trunnion Bridge Beams of the USS-02. Proposed locations for the MMOD shielding are shown in figures 5.14-4 and 5.14-5.

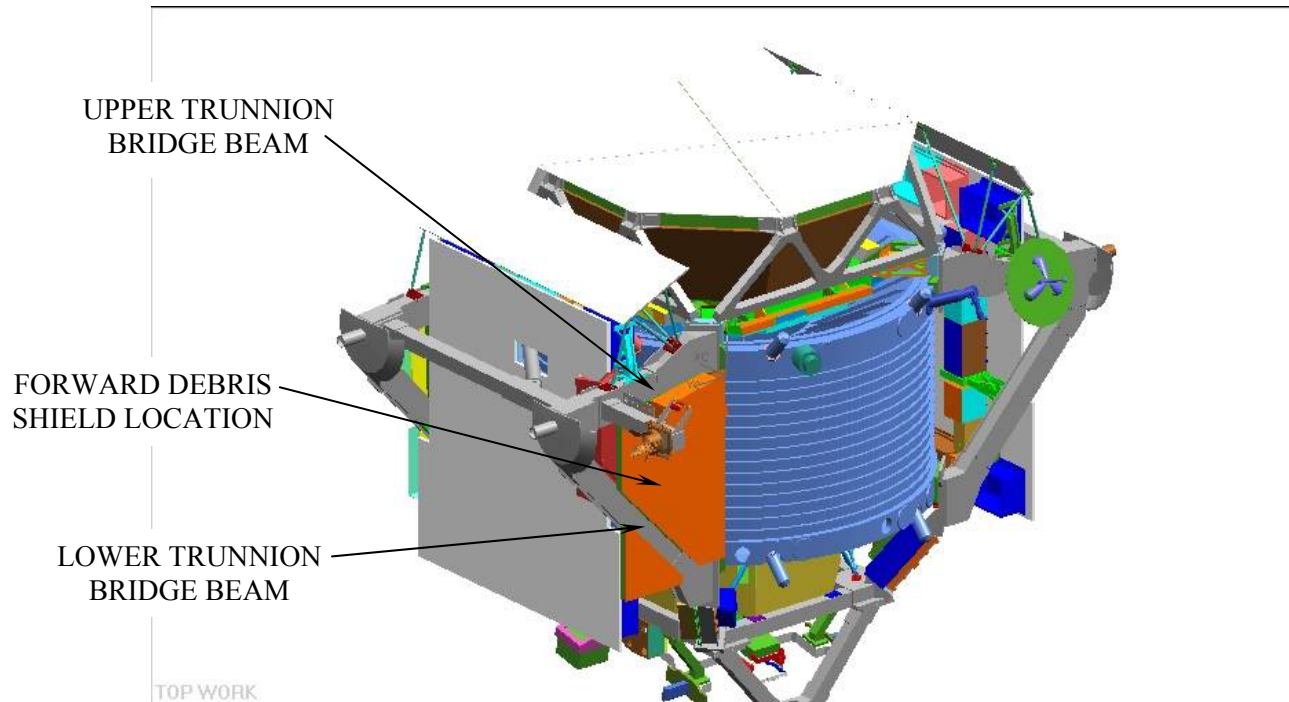


Figure 5.14-4 Warm Helium Supply Debris and Vacuum Case Debris Shield

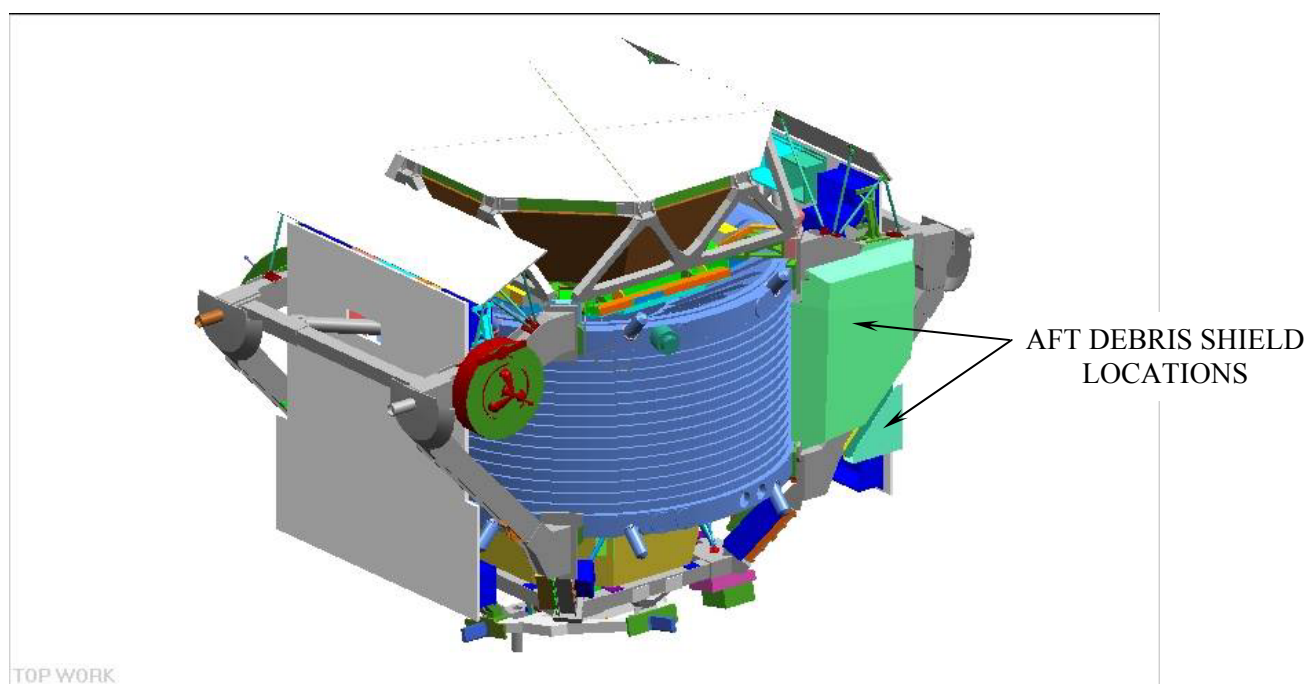


Figure 5.14-5 TRD-Gas Supply and Vacuum Case Debris Shield

The NASA Hypervelocity Impact Technology Facility has been and will continue to perform all of the analysis and testing for the MMOD requirements. Testing has been performed to ensure that the correct ballistic limit equations are used in the analysis. The shields will be designed to meet the ISS and STS requirements.